State of Illinois
Department of Transportation
Bureau of Materials and Physical Research
Springfield

POLICY MEMORANDUM

Revised: January 1, 2012 18-08.1
This Policy Memorandum supersedes number 18-08.0 dated January 1, 2008

TO: REGIONAL ENGINEERS, HIGHWAY BUREAU CHIEFS, AND MANUFACTURERS AND SUPPLIERS OF FINELY DIVIDED MINERALS

SUBJECT: ACCEPTANCE PROCEDURE FOR FINELY DIVIDED MINERALS USED IN CONCRETE AND OTHER APPLICATIONS

DEFINITIONS

Department - Illinois Department of Transportation.

Bureau - Bureau of Materials and Physical Research, at 126 East Ash Street, Springfield, Illinois 62704-4766.

Finely Divided Mineral - A finely divided material which has cementitious or pozzolanic properties. Examples are fly ash, microsilica (silica fume), ground granulated blast-furnace (GGBF) slag, high-reactivity metakaolin (HRM), and dry expansive component materials Type G or K.

Manufacturer - A company that manufactures a finely divided mineral. The term Producer is also used.

Supplier - A company that supplies a finely divided mineral which it does not manufacture.

Source - The name and location of the manufacturing process from which the finely divided mineral is obtained.

Approved Source - A source that is approved by the Bureau to ship a finely divided mineral for immediate use on Department projects.

Unapproved Source - A source that ships a finely divided mineral which must be sampled, tested, and approved by the Bureau before it is used on Department projects.

Cement - Portland cement.

Dry Expansive Component – A Type G or K dry expansive component as defined in ACI 223R. Per **Department** specifications, the material is mixed with Type I or II portland cement and water to produce a paste that increases in volume and makes shrinkage-compensating concrete. **Finely Divided Minerals** may also be used in the concrete mixture.

Fly Ash - A finely divided residue that results from the combustion of ground or powdered coal, transported from the combustion chamber by exhaust gas, collected by mechanical or electrical means, and stored in stockpiles or bins.

Microsilica - An amorphous silica of high silica content and purity possessing high pozzolanic activity.

Ground Granulated Blast-Furnace (GGBF) Slag - A glassy granular material, formed when molten blast-furnace slag is rapidly chilled, and then finely ground.

High-Reactivity Metakaolin (HRM) - A reactive aluminosilicate pozzolan formed by calcining purified kaolinite at a specific temperature range.

Reference Material - A portland cement used for the control mortar and corresponding test mortars, of a finely divided mineral, to determine its strength activity index.

Preliminary (PRE) Sample - A sample used to determine, in advance, if the finely divided mineral will comply with Department specifications.

Process Control (PRO) Sample - A sample used for the purpose of controlling production of finely divided minerals proposed for incorporation into Department projects.

Acceptance (ACC) Sample - A sample used for accepting/rejecting finely divided minerals prior to its use on Department projects and/or unassigned stock for future use on projects. The quantity represented by acceptance samples must be given.

Independent Assurance (IND) Sample - A sample used to provide an independent check on the reliability of the manufacturer's quality control program.

Investigation (INV) Sample - A destination sample used to verify the acceptability of a finely divided mineral from a source.

Grab Sample - A sample secured from a conveyor, from bulk storage, or from a bulk shipment in one operation.

Composite Sample - Combined grab samples taken at prescribed intervals over a period of time.

NIST - National Institute of Standards and Technology.

CCRL - Cement and Concrete Reference Laboratory.

ISO 9000 or 14000 Series - A program of international quality management system standards developed by the International Organization for Standardization (ISO).

1.0 PURPOSE

To establish procedures whereby materials of mineral origin, furnished by a **Manufacturer** or **Supplier**, will be accepted for use on **Department** projects.

2.0 SCOPE

This procedure is available to all **Manufacturers** or **Suppliers** of domestic and foreign **Finely Divided Minerals**. **Sources** in North America may be **Approved** or **Unapproved**. **Sources** located outside of North America will not be given **Approved Source** status, and the procedures in Sections 5.1 and 5.3 shall apply.

3.0 SPECIFICATION REQUIREMENTS, SAMPLING, AND TEST PROCEDURES

3.1 **Finely Divided Minerals** used on **Department** projects shall meet the material requirements of the **Department's** current "Standard Specifications for Road and Bridge Construction" and current special provisions.

4.0 APPROVED SOURCE PROCEDURE

4.1 A **Manufacturer** or **Supplier** requesting **Source** approval of a **Finely Divided Mineral** shall provide the following to the **Bureau**:

(1) The **Manufacturer**'s or **Supplier**'s name and location.

(2) The **Source** name, location (station), and number of generating units.

(3) The name of the **Finely Divided Mineral** and its class, grade, or type.

(4) A certification that the **Finely Divided Mineral** meets the applicable requirements of Section 3.0.

(5) A 3-month testing history. For a new source or when the **Supplier** for the source is changed, the 3-month requirement is waived and all available test information at the time of application shall be provided.

(6) A copy of the **Manufacturer**'s or **Supplier**'s quality control program.

(7) A copy of the last **CCRL** inspection report of the testing laboratory used by the **Manufacturer** or **Supplier** of **the Finely Divided Mineral,** with documentation of resolution of any discrepancies noted therein. The **Manufacturer** or **Supplier** of **HRM**, **Microsilica**, or **Dry Expansive Component** shall provide a copy of the testing laboratory's **CCRL** inspection report and/or an **ISO 9000 or 14000 Series** certificate. For an alternative quality system program approved by the **Bureau**, a certificate or other documentation shall be provided.

(8) A copy of the Material Safety Data Sheet (MSDS) for the **Finely Divided Mineral**.

At the time of application, the **Manufacturer** or **Supplier** shall obtain a **Preliminary (PRE) Grab Sample** of the **Finely Divided Mineral** from current production. However, this shall not apply to **Dry Expansive Component**. The **Manufacturer** or **Supplier** shall split the **PRE Sample** and place one portion in an airtight container

and deliver it to the **Bureau**. A sample of the **Reference Material** used by the **Manufacturer** or **Supplier** for testing shall be included. The **Manufacturer** or **Supplier** shall assume the cost to deliver the samples to the **Bureau**. The size of the **Bureau's** portion of the **PRE Sample**, and the **Reference Material**, shall not be less than 6 lb. (3 kg) each and the samples shall be properly identified as required in Attachment 1. The **Manufacturer** or **Supplier** shall test the retained portion of the **PRE Sample** for the standard physical and chemical properties listed in the applicable specification in Section 3.0 and deliver a copy of the test results to the **Bureau** for comparison.

The **Bureau** will test its portion of the **PRE Grab Sample** for conformance to Section 3.0. The **Bureau** will compare the results obtained by both laboratories to determine compliance with the allowable difference between two laboratories set forth in the precision statement of each test method. Additional split sample testing will be required if the test results obtained on the **PRE Grab Sample** do not comply with the specification requirements of this policy memorandum.

At the time of application for **Dry Expansive Component**, the **Manufacturer** or **Supplier** shall submit a report prepared by an independent laboratory inspected by **CCRL**. The report shall show the result of ASTM C 806 conducted no more than five years prior to the time of submittal. The **Dry Expansive Component** shall be used in combination with Type I or II cement. The minimum restrained expansion shall be 0.04 percent at seven days as determined according to ASTM C 806. The maximum restrained expansion shall be 0.18 percent.

An inspector from the **Bureau** may conduct a scheduled visit to inspect the laboratory facilities designated by the **Manufacturer** or **Supplier** to test the **Finely Divided Mineral**; the **Source** manufacturing process, the **Source** storage facilities; and the quality control policies, procedures, and practices used by the **Manufacturer** or **Supplier**. The **Manufacturer** or **Supplier** shall be responsible for payment of transportation, per diem (meals), lodging, and incidental travel costs incurred by the **Department**.

The **Bureau** will notify the **Manufacturer** or **Supplier**, in writing, if the request for **Approved Source** status is granted or denied. A request may be denied if the **Manufacturer** or **Supplier** fails to meet the requirements of this policy memorandum, or for other reasons determined by the **Department**.

4.2 Quality Control Requirements for **Approved Sources**:

The **Manufacturer** or **Supplier** shall establish and maintain quality control policies and procedures for sampling and testing that are approved by the **Bureau**. The **Bureau** shall be notified of any changes in the **Manufacturer's** or **Supplier**'s quality control program.

Testing laboratories used by the **Manufacturers** or **Suppliers** of **Fly Ash**, **GGBF Slag**, and **Dry Expansive Component** shall participate in the **CCRL** pozzolan program of the **NIST**, which includes inspection of facilities and testing of comparative samples. As an alternative to the **CCRL** pozzolan program of the **NIST**, testing laboratories used by the **Manufacturers** or **Suppliers** of **GGBF Slag** and **Dry Expansive Component** may participate in the **CCRL** cement program. As another alternative**,** testing laboratories used by the **Manufacturers** or **Suppliers** of **Dry Expansive Component** shall have implemented a quality management system based on the **ISO 9000 or 14000 Series** standards in lieu of participating in a **CCRL**

program. Testing laboratories used by the **Manufacturers** or **Suppliers** of **Microsilica** or **HRM** shall participate in the **CCRL** pozzolan program of the **NIST** or shall have implemented a quality management system based on the **ISO 9000 or 14000 Series** standards.

Testing laboratories participating in an alternative quality system program that is not listed in the previous paragraph shall submit details of the program for approval by the **Bureau**.

4.3 Reporting Requirements for **Approved Sources**:

The **Manufacturer** or **Supplier** shall deliver a test report to the **Bureau** which lists the results of all **Grab** and/or **Composite Samples** taken and tested for the specified reporting period.

For **Fly Ash**, the report shall be monthly, and shall be delivered no later than forty calendar days after the end of the month. If the **Fly Ash Source** is sampling more frequently than once per month according to ASTM C 311, then the report shall be delivered no later than forty calendar days after the end of the composite date. If the deadline falls on a Saturday, Sunday, or State Holiday, the deadline shall be the next work day.

For **GGBF Slag**, **HRM**, **Microsilica**, and **Dry Expansive Component**, the report shall be quarterly and shall be delivered no later than forty calendar days after the end of each quarter. For the purpose of the reports, the quarters shall end March 30, June 30, September 30, and December 31. If the deadline falls on a Saturday, Sunday, or State Holiday, the deadline shall be the next work day.

Sampling, testing, and reporting shall be done according to the applicable specification in Section 3.0.

4.4 Record Requirements for **Approved Sources**:

Records of production control tests shall be maintained by the **Manufacturer** or **Supplier** for a minimum period of 5 years, and shall be made available to the **Bureau** upon request.

Copies of bills of lading of quantities of **Finely Divided Minerals** shipped shall be maintained by the **Manufacturer** or **Supplier** for a minimum period of 3 years, and shall be made available to the **Bureau** upon request.

4.5 Sampling and Test Requirements for **Approved Sources**:

For **Fly Ash**, each February, May, August, and November, the **Supplier** shall obtain a **Process Control (PRO) Grab Sample**.

For **GGBF Slag**, **HRM**, and **Microsilica**, each January, April, July, and October, the **Manufacturer** or **Supplier** shall obtain a **PRO Grab Sample**.

For **Dry Expansive Component**, **PRO Grab Samples** are not required.

The **PRO Grab Sample** shall be split for testing by the **Manufacturer** or **Supplier** and the **Bureau**. At this time, a sample of the current **Reference Material** used by the **Manufacturer** or **Supplier** for testing shall also be split.

The **Bureau** may require that more frequent **PRO Grab Samples** be obtained and tested. These samples may be requested because of a change in the material, variations in test results between the **Bureau** and **Manufacturer** or **Supplier**, field test results, or other reasons as determined by the **Bureau**. The **Bureau** samples shall be placed in airtight containers, properly identified on form BMPR CM01 (www.dot.il.gov/materials/materialforms.html), and delivered to the **Bureau** no later than the last work day of the month. Each **Finely Divided Mineral** sample and **Reference Material** sample shall not be less than 6 lb. (3 kg).

The **Manufacturer** or **Supplier** shall test the retained portion of each **PRO Sample**, using the retained portion of the **Reference Material**, for the standard physical and chemical properties listed in the applicable specification in Section 3.0. When all tests are completed, the **Manufacturer** or **Supplier** shall record the test results on a report form that identifies the sample as a **PRO Sample**, and deliver the report to the **Bureau** no later than the last work day of the following month from the date of sample.

The test results obtained by the **Manufacturer** or **Supplier** and the **Bureau** on all split samples will be compared for compliance with the allowable differences for two laboratories set forth in the precision statement of each test method and for compliance with Section 3.0. If significant differences exist in the split sample test results, the **Department** will investigate sampling and test procedures, or require additional comparative sampling to determine the cause of the variation.

4.6 **Department** Inspections of **Approved Sources**:

An inspector from the **Bureau** may conduct unscheduled visits, at **Department** expense, to each **Approved Source** or one of its terminals. During this visit, the inspector may take or witness the taking of a random **Independent Assurance (IND) Grab Sample**. If a sample is taken, the inspector will split the sample and deliver an equal portion to the **Manufacturer** or **Supplier**. The **Manufacturer** or **Supplier** shall test the retained portion of the split sample for the standard physical and chemical properties listed in the applicable specification and deliver the test results to the **Bureau**, as specified in Section 4.5, for comparison and compliance with Section 3.0.

Random **Investigation (INV) Samples** of the **Finely Divided Minerals** and the project **Cement** will be obtained at final destination by a representative of the **Department**. The representative will either take or witness the taking of the **INV Samples**. **INV Samples** will be **Grab Samples** and shall not be less than 6 lb. (3 kg). (Note: **Cement** samples will be taken according to AASHTO T 127).

The sampling location and frequency for obtaining **INV Samples** will be determined by the **Bureau** in consultation with the district offices.

The **Bureau** will test **INV Samples** to ascertain the results of **Finely Divided Mineral**-project **Cement** combinations. To verify that **Finely Divided Minerals** shipped from **Approved Sources** meet the requirements of Section 3.0, the **Bureau** will test **INV Samples** with the appropriate **Reference Material**.

4.7 **Approved Source** with Multiple **Suppliers**:

In some cases an **Approved Source** will establish contract agreements with various **Suppliers** to sell their product. These **Suppliers** typically will use their own trade name for the product. A **Supplier** who desires to be listed on the Bureau's approved list shall have the **Approved Source** provide the **Bureau** a copy of the contract agreement. The **Supplier** and product trade name will be listed as long as the **Approved Source** remains in compliance with this Policy Memorandum. If the **Approved Source** is removed, the **Supplier** has the option to get approved by meeting the requirements established for an **Approved Source**.

4.8 Revocation of **Approved Source** Status:

Failure of a **Manufacturer** or **Supplier** to meet the requirements of Sections 3.0 and 4.0 of this policy memorandum will be sufficient cause to revoke **Approved Source** status. The occurrence of three late submittals in a twelve month period for any of the following: test report (**Grab** or **Composite Samples**), **PRO Sample**, or **PRO** test results; will result in a meeting with the **Manufacturer** or **Supplier**. The **Manufacturer** or **Supplier** will be given an opportunity to submit a plan for corrective action. Failure to correct the late submittal problem will result in revocation of **Approved Source** status. A late submittal will be based on the postmark date. If there is no postmark date, a late submittal will be based on date of receipt by **Bureau.**

Failure to resolve significant differences in testing, as indicated by the test results obtained on **PRO** or **IND Samples** split with the **Manufacturer** or **Supplier** will be sufficient cause to revoke **Approved Source** status.

Failure of the testing laboratory, used by the **Manufacturer** or **Supplier** of a **Finely Divided Mineral**, to satisfactorily resolve the discrepancies noted in the **CCRL** inspection report, or maintain a quality management system (ISO or alternative quality system program) will be sufficient cause to revoke **Approved Source** status.

Revocation of **Approved Source** status will be reported to the **Manufacturer** or **Supplier** in writing. The **Manufacturer** or **Supplier** may re-apply for **Approved Source** status any time after revocation. However, a minimum of 28 days shall have elapsed from the date of revocation before reinstatement will be considered. The actual date of reinstatement is subject to the determination of the Engineer that the problem is corrected.

5.0 UNAPPROVED SOURCE PROCEDURE

5.1 A **Manufacturer** or **Supplier** requesting approval of a **Finely Divided Mineral** from an **Unapproved Source** shall provide the following to the **Bureau**:

(1) The **Manufacturer's** or **Supplier's** name and location.

(2) The **Source** name, location (station), and number of generating units.

(3) The name of the **Finely Divided Mineral** and its class or grade. However, the **Unapproved Source** procedure will not be permitted for **Dry Expansive Component**.

(4) A current test report, in English, which indicates the standard physical and chemical composition of the **Finely Divided Mineral** as per Section 3.0.

(5) The transportation method and location at which an inspector from the **Bureau** will be able to obtain **Acceptance (ACC) Samples**.

(6) If requested by the **Bureau**, the **Manufacturer** or **Supplier** shall deliver to the **Bureau** a 24-hr **Composite Preliminary (PRE) Sample** of the **Finely Divided Mineral** from current shipments. The **Manufacturer** or **Supplier** shall assume the cost to deliver it to the **Bureau**. The size of the **PRE Sample** shall not be less than 6 lb. (3 kg) and the sample shall be properly identified as required in Attachment 1.

5.2 Sampling and Test Requirements for **Unapproved Sources** in North America:

(1) **Finely Divided Minerals** from an **Unapproved Source** will be sampled, tested, and approved by the **Bureau** before use on **Department** projects. The **Bureau** has the option to affix a seal to secure **Finely Divided Minerals** in storage (e.g. silo, truck, railroad car, or barge) until the **Bureau's** testing is completed.

(2) Upon arrival of the **Finely Divided Mineral** to Illinois, an inspector from the **Bureau** will obtain **Acceptance (ACC) Grab Samples** according to the applicable specifications. The **Bureau** will determine the number of representative samples required.

(3) The **Manufacturer** or **Supplier** may request the **Bureau** to sample the **Finely Divided Mineral** prior to arrival in Illinois. In the event the request is approved, the **Manufacturer** or **Supplier** shall be responsible for payment of transportation, per diem (meals), lodging, and incidental travel costs incurred by the **Department** inspector. If the **Department** determines that it lacks the resources to accomplish out-of-state inspection, the **Finely Divided Mineral** may be sampled and tested according to the procedures in Section 5.3.

(4) **Acceptance (ACC) Samples** will be tested by the **Bureau** for conformance to Section 3.0, and to approve the **Finely Divided Mineral** for use on **Department** projects.

(5) **Random Investigation (INV) Samples** of **Finely Divided Minerals** may be obtained at final destination by a representative of the **Department**. The representative will either take or witness the taking of the **INV Samples**. **INV Samples** will be **Grab Samples** and will be taken according to the applicable specification. The sampling location and frequency for obtaining **INV Samples** will be determined by the **Bureau** in consultation with the district offices. The **Bureau** will use **INV Samples** to verify that the **Finely Divided Mineral** shipped meets the requirements of Section 3.0.

5.3 Sampling and Test Requirements for **Unapproved Sources** Located Outside North America:

An agent of the importer shall obtain an **Independent Assurance (IND) Grab Sample** from each barge of foreign **Finely Divided Mineral** loaded at the port of entry and destined for Illinois.

The agent shall split each barge **Grab Sample** and mail one portion to the **Bureau**. The other portion shall be mailed to the importer's testing laboratory that is approved by the **Department**. The importer of the **Finely Divided Mineral** shall be responsible for all sampling and mailing costs.

The importer's laboratory shall test its portion of each barge **Grab Sample** for the standard physical requirements of the applicable specifications. One random barge **Grab Sample**, representing the **Finely Divided Mineral** in each hold of the vessel shall be tested for chemical composition.

Upon completion of the tests, the importer shall deliver to the **Bureau** a certification that states the **Finely Divided Mineral** in the vessel unloaded at the port of entry has been tested by the importer, and complies with the applicable specifications. Attached to the certification shall be a test report of all barge samples. The report shall include the name of the vessel, the source of the **Finely Divided Mineral**, the barge number, the hold number, the date the sample was taken, the quantity of **Finely Divided Mineral** in the barge, and the physical and chemical test results obtained on the samples.

The importer shall immediately notify the **Bureau** if a barge sample fails to meet the applicable specification requirements.

The **Bureau** will review the certification and compare the importer's test data to the test data obtained by the **Bureau** on its portion of each split sample.

When the certification and the accompanying test report are examined and determined to be correct, the **Bureau** will notify the importer and the district offices that the **Finely Divided Mineral** is approved for state projects.

Random Investigation (INV) Samples, from one or more barges, may be taken by a **Department** inspector when the barges arrive at the Illinois terminal(s).

The **Department** will reject any foreign **Finely Divided Mineral** tested by the **Bureau**, or the importer, that does not meet the specification requirements. For split samples where one party is within specification and the other party is out of specification, the **Finely Divided Mineral** will be considered out of specification and will be rejected unless the failing test is determined to be flawed by the **Bureau**.

Alternative proposals to the sampling and test requirements stated in this section will be considered for **Finely Divided Minerals** which have an acceptable quality history, and which have previously been approved by the **Department**. Requests shall be directed to the **Bureau** for approval.

6.0 ACCEPTANCE OF FINELY DIVIDED MINERALS

6.1 **Finely Divided Minerals** will be accepted according to the **Department's** current "Standard Specifications for Road and Bridge Construction," current special provisions, and this policy memorandum.

6.2 The **Bureau** will maintain an "Approved List of Suppliers of Finely Divided Minerals" on the internet, which will indicate the **Approved Sources** of **Finely Divided Minerals** that meet the requirements of this policy memorandum. This list will include the name, location, and Producer/Supplier Number of each approved **Manufacturer** or **Supplier** of **Finely Divided Minerals.** Other information as appropriate will also be provided on the list. These **Manufacturers** or **Suppliers** may ship **Finely Divided Minerals** for immediate use on **Department** projects.

6.3 **Finely Divided Minerals** from **Unapproved Sources** will be approved by the **Bureau** before use on **Department** projects.

7.0 REJECTION OF FINELY DIVIDED MINERALS

7.1 A **Finely Divided Mineral** that fails to conform to the requirements of Section 3.0 of this policy memorandum shall be rejected for use on **Department** projects.

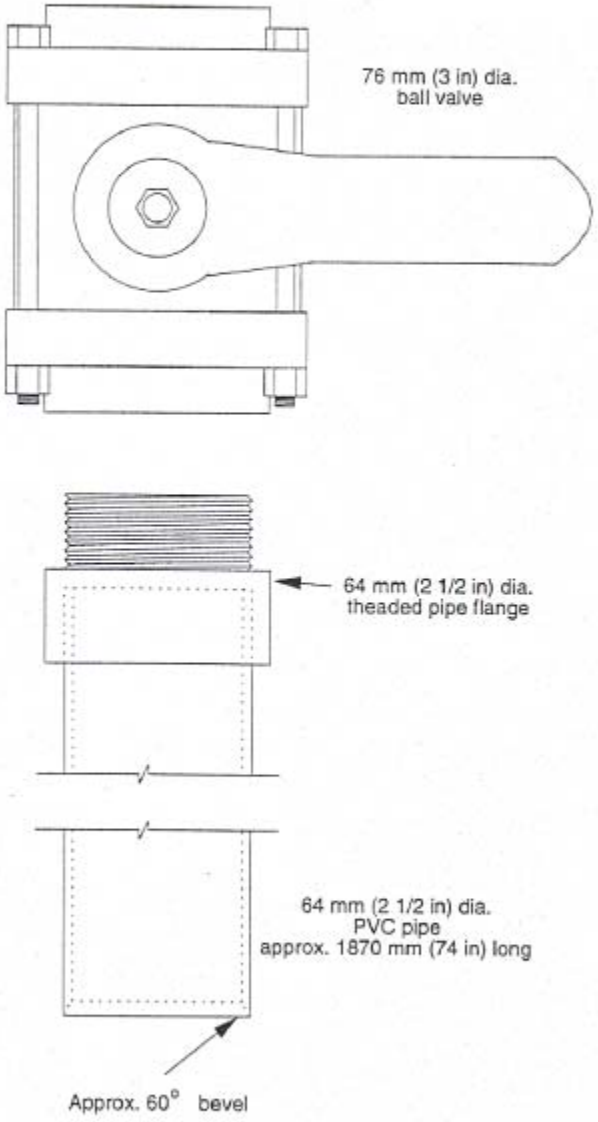
7.2 The **Bureau** will notify the **Manufacturer** or **Supplier** when a **Finely Divided Mineral** is rejected for use on **Department** projects.

David L. Lippert, P.E.
Engineer of Materials
and Physical Research

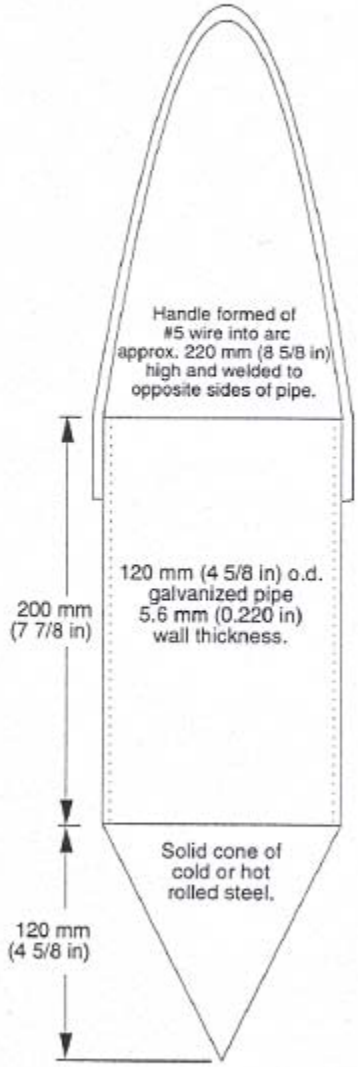
Attachment

DAD/dkt

Vacuum Type Bulk Sampler



Drop Type Bulk Sampler



Note:
Total mass weight of sampler not less than 6 kg (13 lb)

Tube Type Bulk Sampler